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**COMPREHENSIVE LONG-TERM  
ENVIRONMENTAL ACTION  
FINAL SAMPLING AND ANALYSIS PLAN  
FOR SITE 34  
SOLVENT NORTH OF BUILDING 3557  
NAVAL AIR STATION  
PENSACOLA, FLORIDA**

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NAS PENSACOLA  
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**Prepared for:**

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NAVAL AIR STATION  
PENSACOLA, FLORIDA

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**August 25, 1994**

Release of this document requires the prior notification of the Commanding Officer of the Naval Air Station, Pensacola, Florida.

**ERRATA**  
**FINAL SAMPLING AND ANALYSIS PLAN (SAP),**  
**FOR SITE 34**  
**NAVAL AIR STATION (NAS) PENSACOLA**  
**PENSACOLA, FLORIDA**  
**(10/14/94)**

Please make the following additions **or** corrections to the SAP.

**[Bold items enclosed in brackets denote changes to the latest draft of document]**

**Report Documentation Page, 19, Abstract, 1st and 2nd paragraphs**

The purpose of **this** investigation is to delineate **nature**, extent and magnitude of contaminated **soil**, **[sediment]**, and groundwater.

Investigative work will be completed through a three-phased approach consisting of **soil** borings, temporary monitoring wells, permanent monitoring wells, and collection of **soil**, **[sediment]**, and groundwater samples for Target Analyte List/Target Compound List (TAL/TCL) using Contract Laboratory Program (CLP) protocol.

**Page v. Executive Summary, 1st and 2nd**

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**Page 1. Section 1.0 Introduction, 3rd paragraph**

Field activities **to** be performed during the **Preliminary** Site Characterization include the completion of **soil** borings and temporary/permanent monitoring wells, the collection of **soil**, **[sediment]**, and groundwater samples, and a hydrologic and **ecologic** assessment.

**Page 2. Section 1.0 Introduction. 2nd and 3rd paragraphs**

Investigative work will be completed through a three-phased approach consisting of soil borings, temporary monitoring wells, permanent monitoring wells, and collection of soil, [sediment,] and groundwater samples for Target Analyte List/Target Compound List (TAL/TCL) using Contract Laboratory Program (CLP) protocol.

Further assessment activities will depend on whether contaminant concentrations in soil, [sediment,] and groundwater samples exceed the applicable PRGs.

**Page 8. Section 4.0 Field S\_\_\_\_\_**

The field investigation includes a phased approach consisting initially of advancing soil borings, installing temporary, and eventually permanent groundwater monitoring wells, and collecting soil, [sediment,] and groundwater samples using various techniques.

**Page 10. Section 4.2 Sampling and Analytical Requirements. Table 4-1**

See attached Table 4-1

**Page 10. Section 4.2 Sample and Analytical Requirements. 2nd paragraph**

[Soil and/or groundwater] samples for physical parameters and grain size analysis will be collected during Phase II.

**Page 12. Section 3\_\_\_\_\_**

**Rationale. 1st paragraph**

Initial sampling locations, presented in Figure 4-1, will consist of three soil borings, two temporary monitoring wells, [and two sediment samples]. Soil and groundwater samples will be collected for FSA to identify the presence or absence of contaminants at the site. Contaminants identified in this phase will be compared to risk-based PRGs established for each contaminant. [Sediment samples will be collected for GS initially to determine if FSA sample analysis is warranted. If, based on grain size analysis, the sediments have the potential to adsorb contaminants, additional samples will be collected and analyzed for full Target Analyte List/Target Compound List during Phase II.] The investigation will proceed to delineate extent only if contaminants are found to exceed their respective PRGs. Phase II will consist of installation of additional soil borings/temporary monitoring wells [and sediment samples] until adequate definition of contamination is established.

Page 13. Section 4.3 Sample Locations and Rationale. Figure 4-1

See attached Figure 4-1

Page 15. Section 4.3 Sample Locations and Rationale. 2nd paragraph

Add this text:

[Sediment Samples — Two sediment samples **will** be collected within the drainage ditch north of Building 3557. Sediment samples **will** be analyzed for **grain size only** during Phase I sampling. If, based on *grain size analysis*, the sediments have the potential to adsorb contaminants, additional samples **will** be collected and analyzed for full **Target Analyte List/Target Compound List** during Phase **II**.]

Page 16. Section 4.4.4 Sediment Sampling. 3rd paragraph

Add this text:

[4.4.4 Sediment Sampling

Sediment samples **will** be collected using a **stainless** steel hand auger or spoon as described in Section 7.2 of the CSAP.]

Table 4-1 Site 34 Sampling and Analytical Requirements			
Medium	No. of Samples <sup>a</sup>	Analytical Parameter	DQO <sup>b</sup> Level
Soil <sup>c</sup>	[8]	FSA	IV
Sediment <sup>c</sup>	[2]	GS	IV
Groundwater <sup>d</sup>	[6]	FSA	IV
TOTAL	[14] [[2]]	FSA GS	IV IV

Source: Modified from Ecology and Environment, Inc., 1992.

Notes:

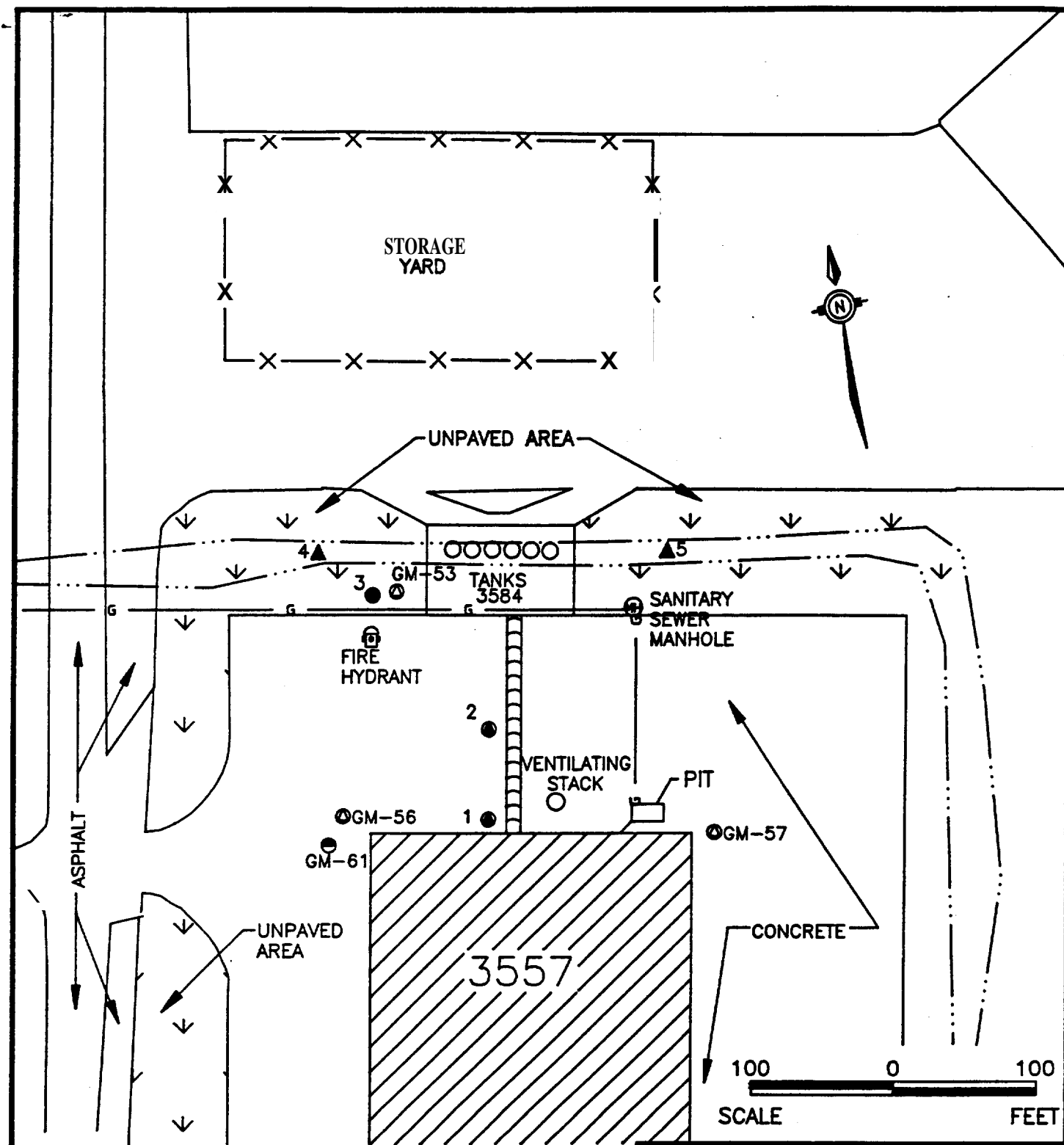
- a = The number of samples shown in parentheses will **be analyzed** for the additional parameters indicated.
- b = **DQO** = Data Quality Objective
- c = Total number of soil samples = [2] soil borings x 3 sample intervals plus 1 soil boring at [2] sample intervals = [8] samples.
- d = Total number of groundwater samples = [6]; 4 existing monitoring wells + [2] new monitoring wells = [6] samples.
- e = Total number of sediment samples = 2 samples **(GS only).**

FSA — Full Scan of Analysis

Target Compound List (TCL) volatile organic compounds, TCL **base-neutral/acid** extractable organic compounds (BNAs), TCL pesticides, TCL polychlorinated biphenyls (PCBs), Target Analyte List (TAL) metals (unfiltered, and TCL cyanide.

[GS — Grain Size Analysis]

**[Bold items enclosed in brackets denote changes to the latest draft of document.]**



# LEGEND

- ▲ - SEDIMENT SAMPLE
- ⊙ - EXISTING SHALLOW MONITORING WELL
- ⊗ - EXISTING DEEP MONITORING WELL
- - SOIL BORING AND TEMPORARY SHALLOW MONITORING WELL
- - SOIL BORING
- G - GRAVITY IWTW SEWER LINE
- ▬ - UTILITY CONDUIT
- ▨ - BUILDING



SAMPLING AND  
ANALYSIS PLAN  
NAS PENSACOLA  
PENSACOLA, FLORIDA

FIGURE 4-1  
PROPOSED PHASE 1  
SAMPLING LOCATIONS  
SITE 34

DWG DATE: 10/10/94 DWG NAME 70SAM34A

This

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## 19. Abstract

This Sampling and Analysis Plan (SAP) is written for Site 34, the Solvent North of Building 3557. The purpose of this investigation is to delineate nature, extent and magnitude of contaminated soil and groundwater.

Investigative work will be completed through a three-phased approach consisting of soil borings, temporary monitoring wells, permanent monitoring wells, and collection of soil and groundwater samples for Target Analyte List/Target Compound List (TAL/TCL) using Contract Laboratory Program (CLP) protocol. Except for the omission of a bentonite seal and neat cement grout, temporary monitoring wells will be constructed, developed, and sampled in accordance with the procedures for permanent monitoring wells. Therefore, the necessity for installation of permanent monitoring wells should be evaluated on a site by site basis by the Navy, U.S. Environmental Protection Agency (USEPA) and Florida Department of Environmental Protection (FDEP).

Phase I activities will identify the presence or absence of contaminants at the site. Preliminary remedial goals (PRGs) will be established following evaluation of Phase I data for identified contaminants. Further assessment activities will depend on whether soil and groundwater samples exceed the applicable PRGs. A technical memorandum summarizing the findings of the first phase of the investigation presenting PRGs and outlining additional work will be prepared following receipt and evaluation of the analytical data.

Phase II of the investigation will be implemented for plume/soil contamination delineation (contaminants above the PRGs) through installation of additional temporary monitoring wells/soil borings. A technical memorandum will summarize the findings of the Phase II plume delineation and recommend locations for permanent monitoring wells. Phase III permanent monitoring wells (and soil borings, if required) will replace strategically located temporary monitoring wells and be used to confirm contamination delineation and risk assessment.

This SAP, in conjunction with the Comprehensive Sampling and Analysis Plan, will provide guidelines for sampling and analytical techniques to be used during the investigation and outline proper documentation procedures for the investigation.

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## List of Acronyms

The following list **contains** many of the acronyms, initials, abbreviations, and **units** of measure **used** in this report.

bls	Below <b>Land Surface</b>
BNAs	base-neutral/acid extractable <b>organic</b> compounds
CLEAN	Comprehensive Long-Term <b>Environmental Action Navy</b>
CLP	Contract <i>Laboratory</i> Program
CSAP	Comprehensive <b>Sampling and Analysis</b> Plan
<b>DQO</b>	<b>Data</b> Quality Objective
<b>E&amp;E</b>	Ecology and <b>Environment</b> , Inc.
<b>E/A&amp;H</b>	<b>EnSafe/Allen &amp; Hoshall</b>
<b>FDEP</b>	<b>Florida</b> Department of <b>Environmental</b> protection
<b>FS</b>	Feasibility Study
<b>FSA</b>	Full <b>Scan</b> of Analysis
<b>G&amp;M</b>	Geraghty and Miller, Inc.
GPS	Global Positioning <b>System</b>
GS	Grain <i>Size</i>
<b>HEX</b>	Hexavalent Chromium Analysis
<b>IAS</b>	<b>Initial</b> Assessment Study
IDR	Interim <b>Data Report</b>
	Industrial Wastewater Treatment Plant
msl	<b>mean sea</b> level
<b>NAS</b> Pensacola	Naval <b>Air Station</b> Pensacola
<b>NEESA</b>	Naval Energy and <b>Environmental Support</b> Activity
<b>OU</b>	Operable Unit
PAHs	polynuclear <b>aromatic</b> hydrocarbons
PCBs	Polychlorinated Biphenyls
<b>ppm</b>	Parts Per <b>Million</b>
<b>PPS</b>	Physical Parameters, <b>Soil</b>
PPW	Physical Parameters, Water
PRGs	<b>Preliminary Remedial Goals</b>
PVC	Polyvinyl <b>chloride</b>
<b>QA</b>	<b>Quality Assurance</b>
QC	Quality Control
RI	<b>Remedial</b> Investigation
<b>SAP</b>	<b>Sampling and Analysis Plan</b>
SOP/QAM	<b>Standard Operating Procedures and Quality Assurance Manual</b>
SOUTHNAVFACEGCOM	Southern Division, <b>U.S.</b> Navy, Naval Facilities <b>Engineering Command</b>
<b>ST</b>	Shelby Tube
TAL	<b>Target Analyte</b> List

TCL  
TKN  
TOC  
TRPHs  
USEPA  
VOCS

Target Compound List  
~~Total~~ Kjeldahl Nitrogen  
Top of Casing  
~~Total~~ Recoverable Petroleum Hydrocarbons  
~~United~~ States ~~Environmental~~ Protection Agency  
~~Volatile~~ *Organic* Compounds

## EXECUTIVE SUMMARY

This Sampling and Analysis Plan (*SAP*) is written for Site 34, the Solvent North of Building 3557. The purpose of this investigation is to delineate nature, extent and magnitude of contaminated soil and groundwater.

Investigative work will be completed through a three-phased approach consisting of soil borings, temporary monitoring wells, permanent monitoring wells, and collection of soil and groundwater samples for Target Analyte List/Target Compound List (TAL/TCL) using Contract Laboratory Program (CLP) protocol. Except for the omission of a bentonite seal and neat cement grout, temporary monitoring wells will be constructed, developed, and sampled in accordance with the procedures for permanent monitoring wells. Therefore, the necessity for installation of permanent monitoring wells should be evaluated on a site by site basis by the Navy, U.S. Environmental Protection Agency (USEPA) and Florida Department of Environmental Protection (FDEP).

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This *SAP*, in conjunction with the Comprehensive Sampling and Analysis Plan, will provide guidelines for sampling and analytical techniques to be used during the investigation and outline proper documentation procedures for the investigation.

## 10 INTRODUCTION

As part of the U.S. Navy Comprehensive Long-Term Environmental Action Navy (CLEAN) Program, a Preliminary Site Characterization will be completed by EnSafe/Allen & Hoshall (E/A&H) at Site 34 — the Solvent North of Building 3557, located at the Naval Air Station Pensacola (NAS Pensacola), Pensacola, Florida. This Sampling and Analysis Plan (SAP) has been developed by E/A&H for this investigation, as tasked by the Southern Division, U.S. Navy, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) under Contract No. N62467-89-D-0318/070.

Primary references for this SAP include the *Comprehensive Sampling and Analysis Plan for Naval Air Station Pensacola* (CSAP) (E/A&H 1993), the United States Environmental Protection Agency (USEPA) *Region IV Standard Operating Procedures and Quality Assurance Manual* (SOP/QAM), and the *Contamination Assessment/Remedial Activities Investigation Work Plan — Group F* completed by Ecology & Environment, Inc. (E&E 1992). References to these documents are made throughout this plan. The investigation of Site 34 will be completed to fulfill requirements set forth in the E&E site work plan (1992) and this site-specific SAP. This investigation will be conducted in accordance with the SOP/QAM and CSAP.

The Site 34 Preliminary Characterization will assess the nature of any potential contamination identified during past and proposed field investigations. The results of the previous Phase I screening investigation are outlined in the *Interim Data Report* (IDR), *Contamination Assessment/Remedial Investigation, Solvent North of Building 3557 (Site 34)* (E&E 1992). Before field activities begin, a well inventory, contaminant source survey, and habitat and biota survey will be conducted. Field activities to be performed during the preliminary Site Characterization include the completion of soil borings and [temporary/permanent] monitoring wells, the collection of soil and groundwater samples, and a hydrologic and ecologic assessment.

Chemical analyses will be completed by a *laboratory* approved by the Naval Energy and Environmental Support Activity (NEESA) using Contract Laboratory Program (CLP) protocol. Field sampling, analytical methods, and reporting will be conducted at USEPA Level IV protocol.

[Investigative work **will** be completed **through** a ~~three-phased~~ approach consisting of soil borings, **temporary** monitoring wells, permanent monitoring wells, and collection of soil and groundwater samples for Target Analyte List/Target Compound List (TAL/TCL) using CLP protocol. Except for the omission of a **bentonite seal** and neat cement grout, temporary monitoring wells **will be** constructed, ~~developed~~, and sampled in accordance with the procedures for permanent monitoring wells. Therefore, the necessity for installation of permanent monitoring wells should be evaluated on a site by site basis by the Navy, USEPA and Florida Department of Environmental Protection (FDEP).

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permanent monitoring wells (and soil borings, if required) will replace strategically located temporary monitoring wells and be used to **confirm contamination** delineation and risk assessment.]

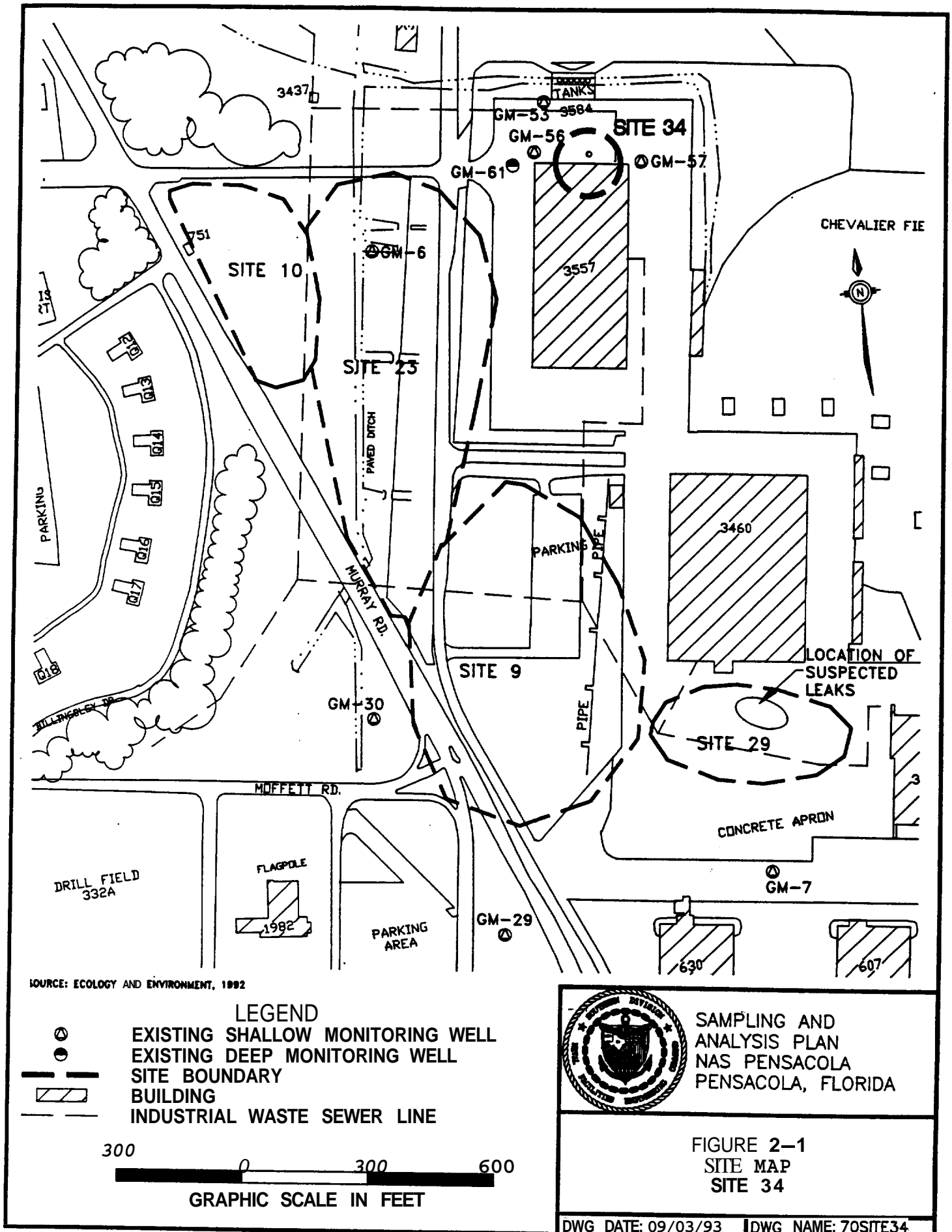
Upon completion of the investigative work and laboratory analysis, a Preliminary Site Characterization report will be submitted to the Navy, USEPA, and FDEP summarizing the activities, results and conclusions of the investigation. The report will provide supporting data for the completion of a baseline risk assessment. If the results of the preliminary Site Characterization warrant a remedial investigation (RI), additional field work, if required, will be performed and the Preliminary Site Characterization Report will be expanded to fulfill RI requirements. A Feasibility Study report will also be completed concurrently with the RI report.

This SAP, in conjunction with the CSAP, will provide guidelines for sampling and analytical techniques to be used during the Preliminary Site Characterization and outline proper documentation procedures for the investigation.

## **2.0 BACKGROUND INFORMATION**

### **2.1 Site Description**

Site 34 is located at the western edge of Chevalier Field, immediately north of Building 3557 (see Figure 2-1). The site is covered by the Chevalier Field concrete apron. A tank farm is located approximately 150 feet north of Building 3557 and consists of [six] above-ground vertical storage tanks designated as T-101 (epoxy stripper MIL-R-81294), T-105 (detergent MIL-C-43616), T-106 (stoddard solvent PD 630-Type II), and T-107 (unknown). The tanks are aligned east to west on a raised concrete foundation. [Also located on the concrete foundation is a small above-ground tank and a small horizontal tank.] Building 3557 is connected to the



tank farm by piping in a paved trench. The land surface elevation is approximately 4 feet above mean sea level (msl). Building 3557 is located on a concrete apron with an elevation of approximately 9 feet above mean sea level. Three shallow groundwater monitoring wells (GM-53, GM-56, and GM-57) and one deep well (GM-61) are located in the vicinity of Site 34. Monitoring well construction details are provided in Table 2-1.

Table 2-1 Construction Details of Monitoring Wells Near Site 34					
Well Designation	Surface Elevation (ft msl)	TOC Elevation (ft msl)	Total Depth Drilled (ft)	Screened Interval (ft)	Depth to Filter Pack (ft)
GM-53	3.7	6.2	15.0	12.5-15.0	6.0
GM-56	9.3	8.98	12.5	10.0-12.5	4.0
GM-57	9.6	9.31	12.5	10.0-12.5	4.0
GM-61	9.3	8.91	87.5	82.5-87.5	76.0

Source: Geraghty & Miller, Inc., 1986

Notes:

TOC = Top of Casing  
msl = Mean sea level

## 2.2 Site History

In May 1984, a leak occurred in a pipeline at the north end of Building 3557 reportedly resulting in the loss of approximately 45,000 gallons of a solvent detergent used for cleaning aircraft (G&M 1986). The solution contained 1.7 percent chlorinated aromatic hydrocarbon solvent, resulting in approximately 750 gallons of solvent released.

[sold items enclosed in brackets denote changes to the first draft of document.]

Contamination of local sediment, ~~soil~~, and/or groundwater may have resulted from the solvent detergent release. Contamination may have penetrated beneath the apron via the expansion, ~~jointing~~ **Separating** individual concrete ~~sections~~, and via runoff of ~~escaped~~ solvent detergent to the unpaved storage tank area. The unpaved drainage ditch in the tank area [~~which discharges to Wetland 6~~] is ~~suspected~~ of **Carrying** contamination offsite and is presumed to be connected to the paved drainage ditch west of Chevalier Field. It is ~~not~~ known if the **NAS Pensacola** storm sewer system was affected by the release.

During a Characterization Study conducted in **1986** by **Geraghty and Miller, Inc. (G&M)**, a faint hydrocarbon odor ~~was~~ observed when monitoring wells **GM-56** and **GM-61** were installed. Groundwater samples from monitoring wells **GM-53**, **GM-56**, **GM-57**, **GM-61**, and **GM-6**, and three surface water samples collected ~~from~~ a downstream ~~portion~~ of the paved ditch ~~west~~ of Chevalier Field, were collected and analyzed for volatile organic compounds (VOCs). The results showed VOCs were present in ~~shallow~~ well **GM-53** (~~2 parts per million [ppm]~~ of benzene and ~~4 ppm~~ of toluene) and in all three surface water samples (~~2 to 42 ppm~~ total VOCs). The G&M Characterization Study **report (1986)** suggested the **source** of VOCs in the ~~surface~~ water samples was not related to Site **34**, because the ~~types~~ of VOCs detected in the groundwater and surface water were different from ~~those~~ released.

E&E performed a ~~Phase I screening~~ investigation of Site 34 to **identify potential contaminants and areas of concern**. The investigation results are detailed in the **E&E IDR (1992)**. During the investigation, soil and groundwater samples were collected and submitted for laboratory analysis. Metals, ~~total~~ recoverable petroleum **hydrocarbons** (TRPHs), polynuclear aromatic hydrocarbons (PAHs) and phenols were detected onsite. E&E concluded the ~~contaminants~~ **are** not indicative of the solvent detergent leak, and ~~additional~~ sources of ~~contaminants~~ **may** be impacting Site **34**.

## 23 Physical Setting

Climatology, biological resources, physiography, and hydrogeology for Site 34 and NAS Pensacola are detailed in Sections 4 through 7 of the E&E site work plan (1992).

### 3.0 PHYSICAL SURVEY

Various physical surveys have been conducted at Site 34 as part of E&E's Phase I screening activities. These include aerial photograph analysis, site reconnaissance, and a surface/particulate air emissions survey. Results of the physical surveys are presented in Section 3 of the IDR (E&E 1992). Relevant information has been considered during the planning of this preliminary Site Characterization and will not be duplicated. Three surveys will be conducted before field activities begin: a well inventory survey, a contaminant source survey, and a habitat and biota survey.

#### Well Inventory

An inventory of existing monitoring wells will be completed in accordance with Section 3.1 of the CSAP.

#### Contaminant Source Survey

A contaminant source survey will be conducted to determine any potential sources and any present or past waste streams at the site. The survey will include a review of previous investigative reports, interviews with present and former NAS Pensacola personnel, aerial photo analysis and a utility survey.

The survey will include the identification of the following:

- Location of previous and current underground and overhead piping and utilities.
- Past and present chemicals used at the site.

[Bold items enclosed in brackets denote changes to the first draft of document.]

- Locations of any known **surface** spills.
- Locations of any known **historical** outfalls.
- Locations and **contents** of any known present **or former underground storage** tanks.

#### Habitat and Biota Survey

A **Phase I** habitat and biota survey **will be performed in accordance with Section 8 of the CSAP.** Data obtained during the Site **34 Preliminary Characterization** will also be used to help assess **ecological risk** to any onsite or **surrounding** terrestrial and aquatic habitats potentially affected by contaminant **migration**. **[The complete ecologic assessment of any adjacent wetland complex will be conducted as part of the RI of Site 41 (NAS Pensacola wetlands).** If ecological **impacts** to wetland **areas** adjacent to **Site 34** are suspected based on **Phase I data**, **Phase II** sampling **will be performed during** the Site **41 RI** and in accordance with the Final RI/FS Work Plan for **OU 41**. If other ecological impacts (terrestrial) are suspected at Site **34** after the **Phase I** survey, **Phase II** sampling **will be implemented as outlined in Section 8 of the CSAP.**]

#### 4.0 **FIELD SAMPLING PLAN**

The field sampling plan describes the sampling and field **measurement** procedures to be used during the **preliminary** Site Characterization. The field investigation includes [a phased approach **consisting initially of**] advancing **soil** borings, **installing** [temporary, and eventually permanent] groundwater monitoring wells, and **collecting soil** and groundwater samples using various techniques. A hydrologic and ecologic **assessment** **will also be conducted for Site 34.**

##### 4.1 Sampling Objectives

The objectives of the field sampling effort are to:

##### **[Phase I]**

**[Bold items enclosed in brackets denote changes to the first draft of document.]**

- Identify potential sources of Contamination.
- a Assess the nature of identified contaminants.
- [• Establish PRGs for the identified contaminants.

Phase II]

- a Delineate the extent of sediment, soil and groundwater contamination.
- Delineate migration pathways of the contaminants.
- a Identify potential receptors of the contaminants.

[Phase III

- Establish permanent monitoring well locations to confirm extent delineation and monitor contaminant migration.]

#### 4.2 Sampling and Analytical Requirements

The sampling and analytical requirements are summarized in Table 4-1 and discussed below. The proposed number of sediment, soil, and groundwater samples is also listed in Table 4-1. The Navy, USEPA, and FDEP will be apprised of any changes in the number of samples collected.

Any additional sources or previously undetected contamination will be investigated by the collection of additional samples from any given media, sampling additional media not included in this site-specific SAP, installation of additional monitoring wells to delineate the extent and depth of contaminants, and performance of additional aquifer response tests to characterize subsurface hydrologic conditions. Before additional field activities begin, a field change request will be submitted to the Navy for approval with notification to the USEPA and FDEP.

Table 4-1 Site 34 Sampling and Analytical Requirements			
Medium	No. of Samples <sup>a</sup>	Analytical Parameter	DQO <sup>b</sup> Level
Soil <sup>c</sup>	[8]	FSA	IV
Groundwater <sup>d</sup>	161	FSA	IV
TOTAL	141	FSA	IV

Source: Modified from Ecology and Environment, Inc., 1992.

Notes:

- a = The number of samples shown in parentheses will be analyzed for the additional parameters indicated.
- b — **DQO** = Data Quality Objective
- c — Total number of soil samples = 121 soil borings x 3 sample intervals plus 1 soil boring at 121 sample intervals = 181 samples.
- d — Total number of groundwater samples = 161; 4 existing monitoring wells + [2] new monitoring wells = 161 samples.

**FSA — Full Scan of Analysis**

Target Compound List (TCL) volatile organic compounds, TCL base-neutral/acid extractable organic compounds (BNAs), TCL pesticides, TCL polychlorinated biphenyls (PCBs), Target Analyte List (TAL) metals (unfiltered), and TCL cyanide.

The USEPA CLP TAL/TCL will be used to provide a legally defensible full spectrum of contaminant analysis. Sediment, soil, and groundwater will be analyzed for *the full TAL/TCL* list with additional non-CLP analysis also being conducted when warranted. [Hexavalent chromium analyses will not be performed on collected samples due to the lack of previous detection during other investigations at NAS Pensacola (OU 10, Site 1, and Site 39).]

[Samples for physical parameters and grain size analyses will be collected during Phase II. The number of samples will be detailed in the Phase I Technical Memorandum.]

[Bold items enclosed in brackets denote changes to the first draft of document.]



Analyses proposed in this *SAP* have been **organized** different than in the E&E site work plan (1992) which **were** subdivided into "Suites A through E." Proposed analytical parameters are now *organized* into the [four] basic groups listed below.

### New Analytical Organization

- **Full Scan of Analysis (FSA)** — A full scan consists of analysis for TCL VOCs, TCL base-neutral/acid extractable organic compounds (BNAs), T U pesticides, TCL polychlorinated biphenyls (PCBs), TAL metals (unfiltered), and TCL cyanide.
- **Physical Parameters, Soil (PPS)** — The parameters include **total** phosphorus, ~~nitrateN~~, **total** Kjeldahl nitrogen (TKN), heterotrophic plate count, total organic carbon, and ~~cation~~ exchange capacity. Additional sample volume will be **collected** for the PPS samples.
- **Grain Size Analysis (GS)**
- **Physical Parameters, Water (PPW)** — The parameters include 5-day biological oxygen demand, chemical oxygen demand, hardness, **total** suspended solids, **alkalinity**, total phosphorus, ~~nitrateN~~, TKN, and heterotrophic plate count. Additional sample volume will be **collected** for the PPW samples.

Modifications have **also** been made to the list of remedial/physical characteristic parameters proposed in the E&E site work plan (1992). Changes were made to the proposed **analyses** to address CERCLA rather than RCRA requirements (i.e., the **omission** of **Appendix IX** analyses) and to **acquire** additional information regarding the physical characteristics of **site sediment**, **soil** and groundwater if a feasibility study is required. Therefore, **certain** parameters have been

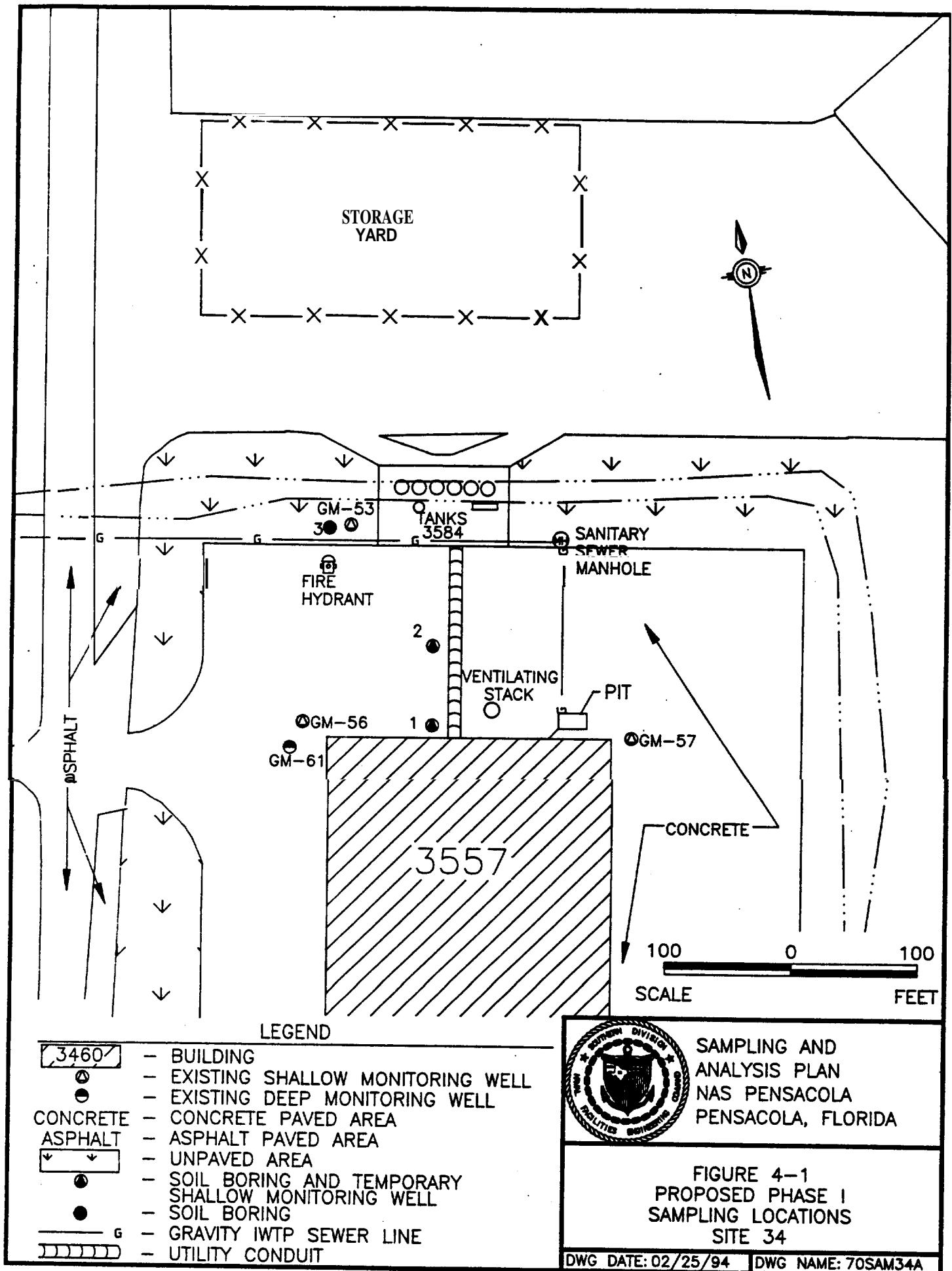
omitted from this SAP because they are either redundant to the comprehensive TAL/TCL analytical methods, provide [information] not legally defensible, or have limited use.

#### 4.3 Sample Locations and Rationale

[The proposed field investigation will consist of a **three-phased** approach. Initial sampling locations, presented in Figure 4-1, will consist of three **soil borings** and two temporary monitoring wells. **Soil** and groundwater samples will be collected for FSA to identify the presence or absence of contaminants at the site. Contaminants identified in this phase will be compared to risk-based PRGs established for each contaminant. The investigation will proceed to delineate extent only if contaminants are found to exceed their respective PRGs. Phase II will consist of installation of additional **soil borings/temporary monitoring wells** until adequate definition of contamination is established. Following evaluation of the data, Phase III permanent monitoring wells and **soil borings** will be installed at locations to replace selected temporary monitoring wells selected to confirm nature and extent of contamination. Permanent wells will be used for possible long-term monitoring and risk assessment and will be located based on current accessibility, any anticipated construction activities, and geometry of the contaminant plume. If contamination is not detected following sampling of the initial temporary monitoring wells, permanent wells will replace temporary monitoring wells and resampled for FSA.] The sampling program and any proposed modifications to the E&E site work plan (1992) are described below.

**Soil Samples** — An FSA will be conducted on approximately [eight] **soil** samples collected from [three] **soil boring** locations. All boring locations will be sampled at the following intervals: 0 to 1 feet below land surface (bls), 1 to 3 feet bls, 3 to 5 feet bls, etc., from the land surface to the depth of the water table. The depth to water is estimated to be between 0.5 and 7 feet bls.

[Bold items enclosed in brackets denote changes to the first draft of document.]



[Additional **soil** borings will be installed if the **contaminants** are identified above their respective **PRGs**. Any **soil** samples collected during **Phase II** will not be analyzed for FSA, but for the **contaminants** positively identified above the **PRGs** in the **first** sampling phase. Confirmatory **Phase III** samples will be analyzed for FSA.]

**PPS** analyses will be conducted on **two soil** samples (**during Phase II**) for potential use in future feasibility studies only if the identified **contaminants** exceed the applicable **PRGs**.] **PPS** samples will be collected representing both background and potentially contaminated conditions. **GS** analysis [also] will [depend on **exceedances** of the **PRGs** and will be conducted on **two**] **soil** samples **representative** of the screened interval. Results of the **GS** analysis will be used to calculate recovery well specifications if a groundwater remediation program is required.

Except for **GS** samples, **soil** samples are not anticipated to be collected below the water table. If visual or olfactory evidence of **contamination** is observed below the water table, a sample will be collected for an **FSA** for characterization and **delineation** of potential **contamination**.

Groundwater Samples — An **FSA** will be conducted on groundwater samples collected from [six] **monitoring** wells (four existing wells and [**two**] proposed [temporary shallow] wells). [The two] **proposed** wells will be shallow with a **target** depth of [10] feet bls.

[Additional temporary monitoring wells will be installed if **contaminants** are identified in groundwater above their respective **PRGs**. **Groundwater** samples collected **during Phase II** will not be analyzed for **FSA**, but rather for the **contaminants** positively identified above the **PRGs** in the first sampling phase. Confirmatory **Phase III** samples will be analyzed for FSA.]

PPW analyses will be conducted [during Phase **II** *only* if the identified **contaminants** exceed the applicable **PRGs** for groundwater. Samples **collected** for PPW analysis will represent both background and contaminated **conditions**.]

#### 4.4 Sampling Procedures

Proposed sampling procedures are presented in Sections 4, 5, 6, and 7 of the CSAP. General sampling requirements will be performed in accordance with section 2.2 of the CSAP with sample processing performed in accordance with Section 12. The sampling procedures and any proposed procedure **modifications** to the CSAP or **E&E site** work plan (1992) are [described] in the following subsections.

##### 4.4.1 Soil Sampling

Soil borings will be advanced using hollow-stem auger drilling techniques. Soil samples will be collected using stainless steel split-barrel samplers with stainless steel liners in accordance with Section 4.6.1 of the CSAP. Shelby tube samples will be **collected** in accordance with Section 4.6.2 of the CSAP.

##### 4.4.2 Monitoring Well Installation and Development

Monitoring well borings will be advanced using hollow-stem auger drilling techniques. The drilling methods and monitoring well **installations** will be in accordance with Sections 5.2 and 5.3 of the CSAP. Because of possible floating contaminants, [the **temporary**] monitoring wells will be installed so the well screen brackets the water table. [The **drilling methods** and monitoring well installation will be in accordance with Sections 5.2 and 5.3 of the CSAP. The temporary wells, with the exception of a bentonite seal and grout, will be constructed in a manner identical to permanent wells.] At least 24 hours after **monitoring** well installation is complete, the monitoring wells will be developed in accordance with Section 5.4 of the CSAP.

[Temporary monitoring wells will be developed using peristaltic pump following initial purging of coarse sediment-laden water using centrifugal pumps.] Monitoring well development [, both temporary and permanent monitoring wells,] will continue until the water withdrawn is free of turbidity based on the geology of the area and pH, temperature and specific conductivity have stabilized. These measurements will be recorded in accordance with Section 10.1 of the CSAP.

#### 4.4.3 Groundwater Sampling

Groundwater sampling will be performed in accordance with Section 6 of the CSAP. [Peristaltic pumps may be used in place of bailers. Purge and sample tubing on peristaltic pumps will be constructed of Teflon and sample collection will take place between the pump and the well as outlined in Section F.1.3 of SOP/QAM. To prevent potential degassing of volatiles, samples collected for VOCs will be collected by disconnecting the tubing from the pump, and allowing the water in the tube to drain into the sample vials. Groundwater samples collected with a peristaltic pump should be collected near the top of the water column and water should be as clear as possible given the subsurface geology (generally between 10 and 30 NTUs).] Field measurements to be recorded during groundwater sampling include pH, temperature, specific conductance, groundwater level, [turbidity,] and organic vapor detection, in accordance with Section 10.1 of the CSAP.

#### 4.5 Hydrologic Assessment

[An initial water level assessment will be performed utilizing the temporary wells during the Phase I portion of the investigation to determine shallow groundwater elevations, shallow groundwaterflow direction(s), and hydraulic gradient(s).] A hydrologic assessment will be performed [on the permanent monitoring wells installed during the Phase III] in accordance with Section 9.6 of the CSAP. Slug tests and/or specific capacity tests will be

performed at selected monitoring wells sufficient for site **characterization**. If groundwater remediation is required, the results of the slug and/or specific capacity tests will be used to design the appropriate pumping tests. The Navy will accept technical responsibility for the design and implementation of these tests. The Navy, USEPA, and FDEP will be kept apprised of the investigation as it progresses, and will be notified before conducting full scale pumping tests. Pumping tests will be performed in accordance with the procedures provided in Section 9.6.2 of the CSAP.

#### 4.6 Ecological Assessment

A minimum of a ~~Phase~~ I habitat and biota survey will be conducted in accordance with Section 8.1 of the CSAP.

#### 4.7 Geodetic Survey

[A geodetic survey will be performed using a Global Positioning System (GPS) in accordance with manufacturer's specifications.]

#### 4.8 Decontamination

Decontamination procedures will be performed in accordance with Section 11 of the CSAP.

#### 4.9 Investigation-Derived ~~Wastes~~

Investigation-derived wastes will be handled in accordance with Section 13 of the CSAP.

#### 4.10 Field Quality Assurance/Quality Control

Field quality assurance/quality control (QA/QC) samples will be collected in accordance with the frequency presented in Table 15-1 of the CSAP. QA/QC procedures to be followed during the investigation will be in accordance with Section 15.2 of the CSAP.

## **5.0 QUALITY ASSURANCE PLAN**

The Quality Assurance Plan presented in Section 15 of the CSAP will be followed during the Site 34 Preliminary Characterization.

## **6.0 DATA MANAGEMENT PLAN**

The Data Management Plan presented in Section 14 of the CSAP will be followed during the Site 34 preliminary Characterization.



## 7.0 REFERENCES

Ecology and Environment, Inc. (1992). *Contamination Assessment/Remedial Activities Investigation Work Plan — Group F, Naval Air Station Pensacoh, Pensacoh, Florida.* Ecology and Environment, Inc.: Pensacola, Florida.

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Geraghty and Miller, Inc. (1986). *characterization Study, Assessment of Potential Groundwater Pollution at Naval Air Station, Pensacola, Florida.* Geraghty and Miller, Inc.: Tampa, Florida.


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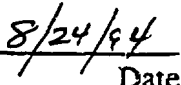
U.S. Environmental Protection Agency. (1991). *Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual,* U.S. Environmental Protection Agency, Region IV: Athens, Georgia.

## FLORIDA PROFESSIONAL GEOLOGIST SEAL

I have read and approve of this Final Sampling and Analysis Plan for Site 34 — Solvent North of Building **3557** and seal it in accordance with Chapter **492** of the Florida Statutes. In sealing this document, I certify the geological information contained in it is true to the best of my knowledge and the geological methods and procedures included herein are consistent with currently accepted geological practices.

Name: Steven J. Parker  
License Number: **#1651**  
**State:** Florida  
Expiration Date: July **31, 1996**

  
\_\_\_\_\_  
Steven J. Parker

  
\_\_\_\_\_  
Date